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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/629,884	07/29/2003	Hardayal Singh Gill	HSJ920030125US1	5556

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EXAMINER	
BERNATZ, KEVIN M	

ART UNIT	PAPER NUMBER
1773	

DATE MAILED: 03/04/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/629,884	GILL, HARDAYAL SINGH	
	Examiner	Art Unit	
	Kevin M Bernatz	1773	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-41* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-41* is/are rejected.

7)☒ Claim(s) *7,23,24 and 41* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. Amendments to the specification and claims 1, 14, 17, 27, 30 and 38 - 41, filed on December 7, 2004, have been entered in the above-identified application.

2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Examiner's Comments

3. The Examiner notes that claims 39 – 41 contain both proper and improper "means plus function" language. To clarify the record, the Examiner wishes to note the following:

4. Regarding claim 39, the limitation "means for providing a first magnetic layer incorporating diffusion components selected to adjust one or more properties of the tunnel junction device" and "means for providing a tunnel barrier layer between the first and second magnetic layers" are improper because the "means" is further limited by "the tunnel barrier layer including diffusion components from the first magnetic layer ...". A proper means-plus-function limitation must not be modified by sufficient structure, material or acts for achieving the specified function (see MPEP § 2181).

The limitation(s) "means for providing a second magnetic layer" is deemed proper means-plus-function limitations. The Examiner notes that while applicant fails to provide a corresponding structure disclosed to meet the means-plus-function language

is "the disclosure of the structure (or material or acts) may be implicit or inherent in the specification if it would have been clear to those skilled in the art what structure (or material or acts) corresponds to the means (or step)-plus-function claim limitation" (MPEP 2181, section II). The Examiner notes that the following are deemed corresponding/equivalent structures meeting the claimed limitations: any known deposition techniques for depositing structures comprising one or more layers.

Should applicant(s) disagree with the Examiner's interpretation of the corresponding or equivalent structures, applicant(s) should provide a clear and concise reasoning behind the disagreement, including column and line cites from the as-filed disclosure supporting their alternative definition(s).

5. Regarding claim 40, the limitation "means for providing a first magnetic layer incorporating diffusion components selected to adjust one or more properties of the tunnel junction device", "means for providing a second magnetic layer" and "means for providing a tunnel barrier layer between the first and second magnetic layers" are subject to the identical analysis as above. Regarding the limitation "means for measuring an electrical resistance ... on magnetic orientations of the first and the second magnetic layers", the Examiner notes that while applicant fails to provide a corresponding structure disclosed to meet the means-plus-function language is "the disclosure of the structure (or material or acts) may be implicit or inherent in the specification if it would have been clear to those skilled in the art what structure (or material or acts) corresponds to the means (or step)-plus-function claim limitation" (MPEP 2181, section II). The Examiner notes that the following are deemed

corresponding/equivalent structures meeting the claimed limitations: any known means of measuring the read-out or writing properties of a tunnel junction sensor via measuring the response of the electrical resistance.

Should applicant(s) disagree with the Examiner's interpretation of the corresponding or equivalent structures, applicant(s) should provide a clear and concise reasoning behind the disagreement, including column and line cites from the as-filed disclosure supporting their alternative definition(s).

6. Regarding claim 41, the limitation "means for providing a first magnetic layer incorporating diffusion components selected to adjust one or more properties of the tunnel junction device", "means for providing a second magnetic layer" and "means for providing a barrier layer between the first and second magnetic layers" are subject to the identical analysis as above.

Regarding the limitations "means for storing data" and "means for sensing the magnetically stored data" are improper because the "means" is further limited by "comprising ... data storage". A proper means-plus-function limitation must not be modified by sufficient structure, material or acts for achieving the specified function (see MPEP § 2181).

Regarding the limitation "means for detecting an electrical resistance ... on magnetic orientations of the first and the second magnetic layers" and "means for moving the means for sensing relative to the means for magnetic data storage", the Examiner notes that while applicant fails to provide a corresponding structure disclosed to meet the means-plus-function language is "the disclosure of the structure (or material

or acts) may be implicit or inherent in the specification if it would have been clear to those skilled in the art what structure (or material or acts) corresponds to the means (or step)-plus-function claim limitation" (MPEP 2181, section II). The Examiner notes that the following are deemed corresponding/equivalent structures meeting the claimed limitations: any known means of measuring the read-out or writing properties of a tunnel junction sensor via measuring the response of the electrical resistance and any known means for controlling the relative location of the head/sensing means to the output/input source, such as by an actuator, etc.

Should applicant(s) disagree with the Examiner's interpretation of the corresponding or equivalent structures, applicant(s) should provide a clear and concise reasoning behind the disagreement, including column and line cites from the as-filed disclosure supporting their alternative definition(s).

Claim Objections

7. Claim 7 is objected to because of the following informalities: "the at least one layer" comprising an alloy of CoFe is confusing since claim 1 recites a plurality of "layers". Applicant should clarify claim 7 to recite that *at least one of the first and second magnetic layers* comprise an alloy of CoFe. Appropriate correction is required.

8. Claims 23 and 24 are objected to because of the following informalities: "the alloy of CoFe comprises" is confusing since claim 17 merely recites magnetic layers. Applicant should clarify claims 23 and 24 to depend from claim 22, not claim 17, which appears to be applicant's intent. Appropriate correction is required.

9. Claim 41 is objected to because of the following informalities: the last word "storage" appears to be in two font sizes and should be corrected. Appropriate correction is required.

Specification

10. The amendment filed December 7, 2004 is objected to under 35 U.S.C. 132 because it introduces new matter into the disclosure. 35 U.S.C. 132 states that no amendment shall introduce new matter into the disclosure of the invention. The added material which is not supported by the original disclosure is as follows: the amendment of page 21 to recite "Å" is not supported by the original disclosure since the range of 3 – 6 could be either nm or Å (see Paragraph 0068 of Hiramoto et al.) and applicant has no explicit support as to which range was intended. Applicant is required to cancel the new matter in the reply to this Office Action.

Claim Rejections - 35 USC § 112

11. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

12. Claim 14 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had

possession of the claimed invention. Applicant does not have support for the amended unit of Å, since the range of 3 – 6 could be either Å or nm based on the evidence in the prior art (Hiramoto et al., Paragraph 0068). Since there is no explicit teaching of the units and the prior art recognizes that the range involved could potentially be more than one clear option, the Examiner notes that the proposed language cannot be clearly conveyed as being obvious to one of ordinary skill as intending "Å".

Claim Rejections - 35 USC § 103

13. Claims 1 – 8, 10 and 12 - 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hiramoto et al. (U.S. Patent App. No. 2003/0017723 A1) for the reasons of record as set forth in Paragraph No.'s 6 – 10 of the Office Action mailed on September 7, 2004.

The Examiner notes that since the scope of claim 14 cannot be readily ascertained, it should not have been rejected in view of the prior art in the prior office action. However, the Examiner notes that Hiramoto et al. teach ranges meeting applicant's presently claimed thickness limitations (*Paragraph 0068*).

14. Claims 17 – 26, 28 – 37 and 39 – 41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hiramoto et al. as applied above, and further in view of Gill (U.S. Patent No. 6,097,579) for the reasons of record as set forth in Paragraph No.'s 11 – 16 of the Office Action mailed on September 7, 2004.

15. Claim 38 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hiramoto et al. as applied above, and further in view of Gallagher et al. (U.S. Patent No. 5,640,343) for the reasons of record as set forth in Paragraph No.'s 17 – 21 of the Office Action mailed on September 7, 2004.

16. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hiramoto et al. as applied above, and further in view of Slaughter et al. (U.S. Patent App. No. 2004/0041183 A1) for the reasons of record as set forth in Paragraph No.'s 22 – 26 of the Office Action mailed on September 7, 2004.

17. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hiramoto et al. in view of Slaughter et al. as applied above, and further in view of Makino et al. (U.S. Patent No. 6,449,133) for the reasons of record as set forth in Paragraph No.'s 27 – 31 of the Office Action mailed on September 7, 2004.

Response to Arguments

18. The rejection of claim 14 under 35 U.S.C § 112 - 2nd Paragraph

Applicant(s) argue(s) that the unit of Å would have been known to one of ordinary skill in the art, pointing to several tunnel junction references. The examiner respectfully disagrees.

While the Examiner acknowledges that *in all likelihood* applicant intended Å, the record is not clear because the prior art of record (i.e. Hiramoto et al.) clearly illustrates

that the units *could* be nanometers instead of angstrom. Since there is no explicit evidence in the record clearly teaching that applicant intended angstroms over nanometers, and the prior art recognizes both units as being appropriate, the Examiner must maintain the rejection of record. The Examiner recommends canceling claim 14 since the prior art recognizes thickness values of both 3 – 6 Å and/or 3 – 6 nm (e.g. Hiramoto et al., Paragraph 0068).

19. The rejection of claims 1 - 41 under 35 U.S.C § 103(a) – Hiramoto et al., alone or in view of various references

Applicant(s) argue(s) that "Hiramoto does not discuss including diffusion components with the magnetic layers anywhere" (*pages 11 – 12 of response*). The examiner respectfully disagrees.

Applicant appears to be arguing nomenclature and/or processing conditions, which are not germane to the determination of patentability of a *product* claim. The claimed structure is a tunnel junction device wherein at least one of the first and second magnetic layers contains at least one element (i.e. a "diffusion component") as in the barrier layer. *How* the at least one element is formed in the magnetic layers and/or barrier layer is not germane to a product claim and Hiramoto et al. clearly disclose structures meeting the above limitations. Applicant is reminded that in a product claim, as long as the prior art product meets the claimed structural limitations, the method by which the product is formed is not germane to the determination of patentability of the

product unless an unobvious difference can be shown to result from the claimed process limitations.

Applicant further argues that the diffusion component must "adjust one or more properties of the tunnel junction device", which is not taught by Hiramoto et al. (*page 12 of response*). The Examiner respectfully disagrees.

The Examiner notes that the limitation "adjust one or more properties of the tunnel junction device" is a broad functional limitation which can be met by any variation, either positive or negative, of any and all properties (e.g. weight, color, smell, as well as the more conventional properties such as resistance, MR ratio, etc) since the "properties" so effected are not recited in the claim language. As such, spin inversion, electron diffusion, etc. are clearly "properties" of the tunnel junction which can be impacted by the choice of materials for the various layers, as well as the more esoteric "properties" of weight, color, smell, etc. Therefore, the Examiner deems that any variation of materials will clearly impact at least one of the essentially infinite "one or more properties of the tunnel junction device" in some manner.

Finally, applicant argues against the combination of Hiramoto et al. with Gill, Gallagher and/or Slaughter, arguing that the Examiner failed to provide proper motivation for the combination. The Examiner respectfully disagrees.

Applicant is reminded that the suggestion to combine need not be express and "may come from the prior art, as filtered through the knowledge of one skilled in the art." *Motorola, Inc. v. Interdigital Tech. Corp.*, 121 F.3d 1461, 1472, 43 USPQ2d 1481, 1489 (Fed. Cir. 1997). As clearly provided in the rejection of record, the disclosed structures

are known and the modification of Hiramoto et al. in view of Gill, Gallagher et al. and/or Slaughter et al. would have been predicated upon the desire to form *functioning* tunnel junction devices. Such devices are taught to require the requisite limitations in the relied upon prior art references, as stated in the rejections of record. As such, the Examiner deems that sufficient motivation to combine the references has been provided, given the knowledge one or ordinary skill in the art would possess upon reading the combined teachings.

Conclusion

20. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Applicant's amendment resulted in embodiments not previously considered (i.e. amendment of claim 14) which necessitated the new grounds of rejection, and hence the finality of this action.

21. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kevin M Bernatz whose telephone number is (571) 272-1505. The examiner can normally be reached on M-F, 9:00 AM - 6:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carol Chaney can be reached on (571) 272-1284. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

KMB
March 1, 2005

Kevin M. Bernatz, PhD
Primary Examiner